

CLAIMS

1. A method for thermal processing of material containing free or chemically bound carbon, wherein the material is supplied into the first end of the reactor and gasifying agent containing oxygen is supplied countercurrently with the supply of the material into the second end of the reactor, the zones of oxidizing and reduction are formed in the reactor, and at least a part of carbon of the material is oxidized by the gasifying agent at high temperature to form solid residue and gaseous reaction products in the oxidizing zone of the reactor and carbon dioxide formed as a result of the oxidation is at least partially reduced at high temperature in the reduction zone of the reactor, formed product gas containing gaseous and possibly liquid reaction products is withdrawn from the first end of the reactor and the solid residue is discharged from the second end of the reactor, *characterized in that the material is shaped before its supply into the reactor and the material is moved through the reactor from the first end of the reactor to the second end of the reactor during the processing, at least one flow-through channel is provided in the reactor, and the gasifying agent is supplied into the reactor and the product gas is withdrawn from the reactor by the channel which is arranged in a parallel direction with the movement of the material so that the gasifying agent flows from the second end of the reactor into the material, between the parts of the material and/or between the material and an internal wall of the reactor and that the product gas formed as a result of the processing is withdrawn out from the first end of the*

reactor, and the channel is provided to ensure contact of the gasifying agent and/or the product gas with the material, and a minimum transverse size of the channel is not more than 1/100 from total length of the channel.

2. A method according to claim 1, characterized in that the minimum transverse size of the channel is not less than 5 mm.

3. A method according to claim 1 or 2, characterized in that the ratio between the summary cross-sectional area of the channel and the summary cross-sectional area of the material is within the limits from 0,05 to 3,0.

4. A method according to anyone of claims 1 - 3, characterized in that a pair of channels having elongated cross section are formed and arranged essentially parallel to each other, and the gasifying agent is supplied into the first channel of these adjacent channels which is in contact with a portion of the material located between these channels, and the gasifying agent which flows in the second channel of the pair is not in contact with said same portion of the material.

5. A method according to anyone of claims 1 - 4, characterized in that at least one channel is formed between the material and the internal wall of the reactor, and the material is loaded on the pallet.

6. A method according to anyone of claims 1 - 4, characterized in that one or several channels are formed between the portions of the material, and the portions of the material are loaded on the pallets which are located above with each other so that at

least one channel is formed between each pallet and the material loaded on the adjacent underlying pallet.

7. A method according to claim 5 or 6, characterized in that the gas-impermeable pallets are used.

5 8. A method according to claim 5 or 6, characterized in that the gas-permeable pallets are used to guarantee the contact of the gasifying agent with the material.

9. A method according to anyone of claims 1 - 4,
10 characterized in that said channel is formed by facing its walls of at least one solid article into which the material and/or the blocks of the material are entered.

10. A method according to anyone of claims 1 - 4,
15 characterized in that said channel is formed by the article with at least one flow-through channel.

11. A method according to claim 10, characterized in that said material is loaded into the article which has at least one flow-through channel.

20 12. A method according to anyone of claims 1 - 11, characterized in that at least portion of the product gas is withdrawn from reduction zone of the reactor in one or several places of this zone and at least portion of fractions of the liquid products are
25 separated from the product gas.

13. A method according to anyone of claims 1 - 12, characterized in that steam and/or carbon dioxide are supplied into the second end of the reactor.

14. Apparatus for thermal processing of material
30 containing free or chemically bound carbon, said apparatus comprising a reactor (3), means for supplying the material (1) into the first end of the reactor

and, means for supplying a gasifying agent (2) counter-
currently with the supply of the material into the
second end of the reactor, means for discharging the
solid residue (5) formed during the processing from
5 the reactor and means for withdrawal of the product
gas (4) containing gaseous and probably liquid prod-
ucts formed during the processing from the reactor,
characterized in that said reactor (3) is a tunnel
furnace and the apparatus comprises means (7) for mov-
10 ing the material (1) through the reactor during the
processing and at least one flow-through channel (6)
for providing the flow of the gasifying agent (2) into
the reactor and the flow of the product gas (4) from
the reactor and ensuring the contact of the gasifying
15 agent (2) and/or the product gas (4) with the material
(1) so that the gasifying agent (2) flows from the
second end of the reactor into the material, between
the parts of the material and/or between the material
and an internal wall of the reactor and that the prod-
20 uct gas (4) formed as a result of the processing is
withdrawn out from the first end of the reactor, and
channel (6) has been arranged in a parallel direction
with the movement of the material provided by the
means (7) for moving the material, and minimum trans-
25 verse size of the channel is not more than 1/100 from
the length of the channel.

15. Apparatus according to claim 14, *character-*
ized in that the means of supply and movement of the
material comprise at least one platform for executing
30 the movement of the material over the tunnel furnace
and at least one pallet (7) for placing the material
(1) on the pallet, and the pallet has been installed

on the platform.

16. Apparatus according to claim 15, characterized in that the pallets (7) have been provided in the reactor so that at least one channel (6) has
5 formed between the material placed on the pallet (7) and wall of the reactor or between each pallet (7) and the material (1) placed on the adjacent underlying pallet.

17. Apparatus according to anyone of claims 15-
10 16, characterized in that the tunnel furnace comprises rails for moving the material and the platforms which have wheels for moving along said rails.

18. Apparatus according to anyone of claims 15-
15 17, characterized in that the pallets (7) are gas-impermeable.

19. Apparatus according to anyone of claims 15-17, characterized in that the pallets (7) are gas-permeable

20. Apparatus according to anyone of claims 14-
20 19, characterized in that the tunnel furnace comprises the additional means for withdrawal at least portion of the product gas from the tunnel furnace in one or several places.

21. Apparatus according to claim 20, characterized in that said additional means comprise means
25 for separation of liquid products from the product gas.